Specification Amendments

Please replace paragraph [0031] with the following replacement paragraph:

[0031] The present invention is generally directed to a new and improved thrust pad assembly which is suitable for preventing deposition of excess quantities of metal onto the edge or peripheral region of a substrate as copper or other metal is electroplated onto the substrate in the fabrication of semiconductor integrated circuits on the substrate. The thrust pad assembly eliminates the need for edge bevel cleaning or removal of excess metal from the edge region of the substrate after the electroplating process. The thrust pad assembly typically includes an air platen through which air is applied at variable pressures to the central and edge regions, respectively, of a thrust pad. The thrust pad, in turn, transmits this variable pressure to a contact ring which is electrically connected to the electroplating current source. The thrust pad applies relatively less pressure to the edge region than to the central region of the substrate, thus reducing ohmic contact between the contact ring and the edge region of the substrate. Electrical resistance between the anode and the edge region of the substrate is ~~reduced~~

increased with respect to the electrical resistance between the anode and the central region of the substrate. This variable pressure application to the substrate, and resulting disparity in electrical resistance, is used to control the substrate plating shape such that excess electroplating of the metal onto the edge region of the substrate is reduced or eliminated while electroplating of the metal onto the central region of the substrate remains optimal.

Please replace paragraph [0036] with the following replacement paragraph:

[0036] Referring next to FIGS. 3 and 4, in application of the thrust pad assembly 40, the thrust pad assembly 40 is initially assembled in the bath container 64, with the clamp 52 (FIG. 3) attaching the wafer 54 to the contact ring 50, and the anode 66 and the thrust pad assembly 40 with the cathode/wafer ~~66~~ 54 are immersed in the electrolyte bath 70. The electroplating system 60 is operated typically in conventional fashion to electroplate the metal from the metal electrolyte solution in the bath 70, onto the patterned surface 57a of the wafer 54. Accordingly, the current source 62 applies a selected voltage potential, typically at room temperature, between the anode 66 and the cathode/wafer

54. This voltage potential creates a magnetic field 78 around the anode 66 and the cathode/wafer 54, which magnetic field affects the distribution of the metal ions in the electrolyte bath 70. In a typical copper electroplating application, a voltage potential of about 2 volts may be applied for about 2 minutes, and a current of about 4.5 amps flows between the anode 66 and the cathode/wafer 54. Consequently, the metal is oxidized typically at the upper oxidizing surface 72 of the anode 66 as electrons from the metal anode 66 reduce the ionic metal in the electrolyte solution bath 70 to form a substantially corrosion-resistant electroplated metal layer 74 on the patterned surface 57a of the wafer 54, as shown in FIG. 4, at the interface between the cathode/wafer 54 and the electrolyte bath 70.

Please replace paragraph [0037] with the following replacement paragraph:

[0037] As the metal layer 74 is electroplated onto the wafer 54, the contact ring 50 of the thrust pad assembly 40 applies pressure of variable magnitude against the backside 57 of the wafer 54, as follows. As shown in FIG. 3, central air pressure 45 is directed from the central air source 76 through the respective central air openings 44 of the air platen 42 and against the

upper surface 49 of the thrust pad 48 at a pressure of typically greater than about 14 psi. Similarly, peripheral air pressure 47 is directed from the peripheral air source 77 through the respective peripheral air openings 46 of the air platen 42 and against the upper surface 49 of the thrust pad 48 at a pressure of typically less than about 14 psi. Accordingly, the central portion of the contact ring 50 applies a pressure of typically greater than about 14 psi to the backside 57 of the wafer 54, whereas the peripheral portion of the contact ring 50 applies a pressure of typically less than about 14 psi to the backside 57 of the wafer 54. Because the ohmic contact between the contact ring 50 and the wafer 54 is directly proportional to the pressure applied by the contact ring 50 against the wafer backside 57, the electrical resistance between the anode 66 and the cathode/wafer 54 at the edge region 54b of the wafer 54 is correspondingly ~~less~~ higher than the electrical resistance between the anode 66 and the cathode/wafer 54 at the center region 54a of the wafer 54. Consequently, the electroplated metal 57a is correspondingly thicker at the center region 54a than at the edge region 54b of the wafer 54 for a given period of electroplating time. Typically, the electroplating process is carried out for a period of typically about 2 minutes to deposit an electroplated metal 74 having a thickness of typically at least about 7,000 angstroms at

the center region 54a and a thickness of typically about 500-1000 angstroms at the edge region 54b of the wafer 54.